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Jc564 U.S. PTO

## UTILITY PATENT APPLICATION TRANSMITTAL

(for nonprovisional applications under 37 C.F.R. § 1.53(b))

Attorney Docket No.

LGPL

Express Mail No.

EL375134605

TO: Box Patent Application  
Assistant Commissioner for Patents  
Washington, D.C. 20231

Inventor(s): KEN A. BEGGS

Title: CHAIR SEAT TILT MECHANISM

Enclosed are:

9	pages of specification including abstract
7	sheet(s) of <b>informal</b> drawings
7	sheets of <b>formal</b> drawings w/letter to Official Draftsperson
X	an assignment of the invention to: Northfield Metal Products Limited, Waterloo, Ontario, CANADA
X	Declaration of Inventor(s): <input checked="" type="checkbox"/> Newly executed <input type="checkbox"/> Copied from a prior application (for contin/div)
	Incorporation by Reference: the entire disclosure of the prior application, from which the copy or copies of the oath or declaration is supplied, is considered to be part of the disclosure of the accompanying application and is hereby incorporated by reference therein.
	Information Disclosure Statement/PTO-1449/Copies of IDS citations.
	other:

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09/611506  
07/07/00

If a Continuing Application: Check appropriate box, and supply the requisite information below:

<input type="checkbox"/> Continuation	<input type="checkbox"/> Divisional	<input type="checkbox"/> Continuation-in-Part (CIP)	of prior application No.
Prior application information:		Examiner:	Group Art Unit:

## CLAIMS AS FILED

	NUMBER FILED	NUMBER EXTRA	RATE	FEE
BASIC FEE			\$690	\$ 690
TOTAL CLAIMS	13 - 20 =	0	X \$ 18	\$
INDEPENDENT CLAIMS	2 - 3 =	0	X \$ 78	\$
MULTIPLE DEPENDENT CLAIM PRESENT			\$260	\$
* Number extra must be zero or larger				TOTAL \$ 690
If applicant has small entity status under 37 CFR 1.9 and 1.27, then divide total fee by 2, and enter amount here.				SMALL ENTITY TOTAL \$

X	A check in the amount of \$ 690 to cover the filing fee is enclosed.
X	Commissioner is hereby authorized to charge/credit Deposit Acct. No. 19-2112 as described below. Enclosed is a duplicate of this sheet.
<input type="checkbox"/>	Charge the amount of \$ _____ as filing fee.
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7/7/00  
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EXPRESS MAIL NO. EL375134605

APPLICATION  
FOR  
UNITED STATES LETTERS PATENT

TITLE: CHAIR SEAT TILT MECHANISM

APPLICANT: Ken A. Beggs

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## CHAIR SEAT TILT MECHANISM

### 5 BACKGROUND OF THE INVENTION

This invention relates to a chair control and to a chair incorporating a chair control.

10 In U.S. Patent No. 5,573,303 to Doerner issued November 12, 1996, a chair control forces the chair seat to tilt forwardly when the backrest is tilted rearwardly. This alleviates circulation problems in an occupant's legs and adjusts the position of the occupant to a more relaxed position. However, an occupant may wish greater control of his or her position.

### 15 SUMMARY OF THE INVENTION

20 In the subject invention, the seat plate of a chair control is pivotably mounted to the main frame so as to be tiltable forwardly and rearwardly. An arm extends from the seat plate and interacts with a stop of the main frame to limit forward and rearward tilting of the seat plate. The arrangement is such that the seat plate has a range of tilting motion irrespective of the tilt of the back bracket for the chair control.

25 According to the present invention, there is provided a chair control, comprising: a main frame having a stop extending therefrom; a back bracket pivotably mounted to said main frame so as to have a rearward portion tiltable downwardly; a seat plate mounted to said main frame at a main frame pivot so as to be tiltable forwardly and rearwardly regardless of a tilt of said back bracket, said seat plate having an arm extending  
30 therefrom such that forward and rearward tilting of said seat plate is limited by interaction of said arm with said stop.

According to another aspect of the invention, there is provided a chair comprising: a chair base; a chair seat; a chair back; a chair control comprising: a main frame mounted to said base, said main frame having a stop extending therefrom; a back bracket mounted to said chair back, said back bracket pivotably mounted to said main frame so as to have a rearward portion tiltable downwardly; a seat plate mounted to said seat, said seat plate mounted to said main frame at a main frame pivot so as to be tiltable forwardly and rearwardly regardless of a tilt of said back bracket, said seat plate having an arm extending therefrom such that forward and rearward tilting of said seat plate is limited by interaction of said arm with said stop.

#### BRIEF DESCRIPTION OF THE DRAWINGS

In the figures which disclose example embodiments of the invention,

figure 1 is a perspective view of a chair with a chair control made in accordance with this invention,

figure 2 is a partially broken away and partially sectioned side view of a chair control made in accordance with an embodiment of this invention shown in a first position,

figure 3 is a rear view along the lines 2-2 of figure 2,

figure 4 is a side view of the chair control of figure 2 shown in a second position,

figure 5 is a side view of the chair control of figure 2 shown in a third position,

figure 6 is a partially broken away and partially sectioned side view of a chair control made in accordance with another embodiment of this invention shown in a first position, and

figure 7 is a rear view along the lines 7-7 of figure 6.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referencing figures 1 and 2, a chair 11 has a chair control 10 mounted on a spindle base 20 and attached to seat 13 and back 15. Referencing figures 2 and 3, chair control 10 comprises a main frame 12, a seat plate 14, and a back bracket 16. The seat plate 14 and back bracket 16 are pivotably attached to the main frame by main frame pivot 18. The main frame 12 is mounted to spindle 20 of the chair. The chair seat is affixed to seat plate 14 and the back 15 to back bracket 16.

The upper end of an arm 22 is pivotably mounted at the rear of seat plate 14 by seat plate pivot pin 24. The lower end of the arm 22 has a slot 26 which receives a shaft 30 carried by the main frame. A series of arms 32 are pivotably mounted to the back bracket 16 by back bracket pivot pin 34. The lower end of each arm 32 has a slot 36 which receives shaft 30. The arms 32 are interleaved with plate washers 38 received on shaft 30.

A plate 40 fixed to shaft 30 acts as a compression member at one side of arms 32. A sleeve 42 acts as a second compression member at the other side of arms 32. A cam (not shown) can be operated to displace shaft 30 with respect to sleeve 44 so as to draw compression member 40 toward compression member 42.

A pair of tensioned coil springs 50 is mounted between seat plate pivot pin 24 and shaft 30. In conventional fashion, a tensioned spring (not shown) within housing 52 is mounted between main frame 12 and back bracket 16.

With reference to figures 1 to 3, in operation, an occupant of the chair 11 may lean back, overcoming the spring in housing 52, so that the rear portion of back bracket 16 tilts downwardly until the top of slots 36 of back bracket arms 32 abut shaft 30. In this fully reclined position of the back bracket, the occupant may shift his or her weight forwardly or rearwardly to cause the seat plate 14 to tilt forwardly or rearwardly between the solid line and ghost line positions of the seat plate shown in figure 2. As shown in figure 2, with the back bracket in its fully reclined position, the forward tilting of the seat plate is limited by the under surface 54 of the top portion of seat plate 14 stopping against the nose 56 of back bracket 16. As seen in figure 4, with the back bracket in its fully

reclined position, the rearward tilting of the seat plate is limited by the top of slot 26 of seat plate arm 22 stopping against shaft 30 of the main frame. Springs 50 (figure 3) urge the seat plate 14 toward its fully rearwardly tilted position.

5 If the occupant subsequently leans forwardly in the chair, the rear portion of the back bracket 16 tilts upwardly under the urging of the spring in housing 52 until the lower end of slots 36 of back bracket arms 32 stop against shaft 30, as shown in figure 5. In this unreclined position of the back bracket 16, as shown in figure 5, the seat plate 14 may tilt forwardly until the bottom of slot 26 stops against shaft 30. With the back bracket in its  
10 unreclined position, the seat plat may tilt rearwardly until pivot pin 24 of seat plate arm 22 stops against abutment surface 58 of back bracket 16.

With reference to figure 3, the back bracket may be locked in any reclined position by operation of the cam (not shown) which draws compression plate 40 toward  
15 sleeve 42 in order to frictionally engage back bracket arms 32 with plate washers 38. It will be noted that with the back bracket locked in position, the seat plate 14 remains free to tilt forwardly and rearwardly.

From the foregoing description, it will be apparent that an absolute limit for  
20 forward and rearward tilting of the seat plate 14 is defined by the interaction of the slot 26 in the seat plate arm 22 with the main frame shaft 30, which acts as a stop. However, if the back bracket has been tilted downwardly beyond a certain point, the forward tilting of the seat plate is further limited by the seat plate abutting the nose 56 of the back bracket. And if the back bracket has been moved toward its unreclined position beyond a certain point, the  
25 rearward tilting of the seat plate is further limited by the seat plate pivot pin 24 abutting back bracket surface 58. Therefore, by choosing the length of the nose 56 and the maximum spacing between seat plate pivot pin 24 and back bracket surface 58, the range of tilting motion of the seat plate for various positions of the back bracket may be set.

30 Figures 6 and 7 illustrate a second embodiment of a chair control, wherein like parts have like reference numerals. In chair control 110, a series of arms 122 are pivotably attached to seat plate 14 by pivot pin 24. These arms interleave with arms 32 of back bracket 16 at shaft 30. In consequence, when a cam (not shown) moves compression

plate 40 toward sleeve 42, arms 32 and 122 are frictionally engaged to lock both the seat plate 14 and back bracket 16 in position. In this manner, an occupant may lock in a desired tilt for the seat and back rest of the chair. In all other respects, the chair control 110 operates in the same fashion as the chair control 10 of figures 2 to 4.

5

While the absolute limit of the forward and rearward tilt of the seat plate has been described as set by the interaction of arm 22 or arms 122 with shaft 30, other arrangements may be envisaged to accomplish this purpose. For example, an arcuate arm may rigidly depend from seat plate 14 and two spaced fingers extend transversely of the arcuate arm. With this arrangement, the upper finger may abut a pin stop extending from the main frame 12 to define the maximum rearward tilt of the seat plate and the lower arm abut the seat plate to define the maximum forward tilt of the seat plate.

While the nose 56 and abutment surface 58 have been described as the features of the back bracket which may further limit forward or rearward tilting of the seat plate, the back bracket could be configured so that it has other features which provide these further limitations. For example, the back bracket may have upward protrusions which, dependent upon the reclined position of the back bracket, the seat plate may abut as it tilts forwardly or rearwardly.

20

Other modifications will be apparent to those skilled in the art and, therefore, the invention is defined in the claims.

WHAT IS CLAIMED IS:

1. A chair control, comprising:

a main frame having a stop extending therefrom;

a back bracket pivotably mounted to said main frame so as to have a rearward portion tiltable downwardly;

a seat plate mounted to said main frame at a main frame pivot so as to be tiltable forwardly and rearwardly regardless of a tilt of said back bracket, said seat plate having an arm extending therefrom such that forward and rearward tilting of said seat plate is limited by interaction of said arm with said stop.

2. The chair control of claim 1 wherein said back bracket terminates at a nose extending sufficiently forwardly of said main frame pivot that, at least when said back bracket is tilted downwardly so that said stop stops further rearward tilting, said nose limits forward tilting of said seat plate.

3. The chair control of claim 2 wherein said back bracket has an abutment such that, at least when said back bracket is not tilted downwardly, said abutment limits rearward tilting of said seat plate.

4. The chair control of claim 3 wherein said seat plate arm is mounted to said seat plate at a pivot.

5. The chair control of claim 4 wherein said stop is a shaft and said seat plate arm has a slot receiving said shaft.

6. The chair control of claim 5 wherein said back bracket has an arm extending therefrom, said back bracket arm pivotably mounted to said back bracket, said back bracket arm having a slot receiving said shaft such that downward tilting of said back bracket is limited by interaction of said slot of said back bracket with said shaft.



7. The chair control of claim 6 wherein said seat plate arm is one of a like plurality of seat plate arms and wherein said back bracket arm is one of a like plurality of back bracket arms, said seat plate arms being interleaved with said back bracket arms and further comprising a pair of compression members for compressing said arms together in order to lock said back bracket and said seat plate in position.

8. The chair control of claim 6 wherein said back bracket arm is one of a like plurality of back bracket arms, said back bracket arms being interleaved with friction plates carried by said shaft and further comprising a pair of compression members for compressing said arms and friction plates together in order to lock said back bracket in position.

9. The chair control of claim 6 wherein said back bracket is pivotably mounted to said main frame at said main frame pivot.

10. The chair control of claim 6 including a spring to bias said seat plate toward a rearward tilted position.

11. A chair comprising:

a chair base;

a chair seat;

a chair back;

a chair control comprising;

a main frame mounted to said base, said main frame having a stop extending therefrom;

a back bracket mounted to said chair back, said back bracket pivotably mounted to said main frame so as to have a rearward portion tiltable downwardly;

a seat plate mounted to said seat, said seat plate mounted to said main frame at a main frame pivot so as to be tiltable forwardly and rearwardly regardless of a tilt of said back bracket, said seat plate having an arm extending therefrom such that forward and rearward tilting of said seat plate is limited by interaction of said arm with said stop.

12. The chair of claim 11 wherein said back bracket terminates at a nose extending sufficiently forwardly of said main frame pivot that, at least when said back bracket is tilted

downwardly so that said stop stops further rearward tilting, said nose limits forward tilting of said seat plate.

13. The chair control of claim 12 wherein said back bracket has an abutment such that, at least when said back bracket is not tilted downwardly, said abutment limits rearward tilting of said seat plate.

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[illegible][illegible]

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re the application of:	)	
	)	
Ken A. Beggs	)	
	)	Group Art Unit:
Serial No.:	)	
	)	Examiner:
Filed:	)	
	)	Attorney Docket: LGPL
For: CHAIR SEAT TILT MECHANISM	)	

**LETTER TO OFFICIAL DRAFTSPERSON**

The Assistant Commissioner for Patents  
Washington, D.C. 20231  
U.S.A.

Dear Sir:

We enclose a substitute set of formal drawings for this application.

Respectfully submitted,



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July 6, 2000  
Enclosure  
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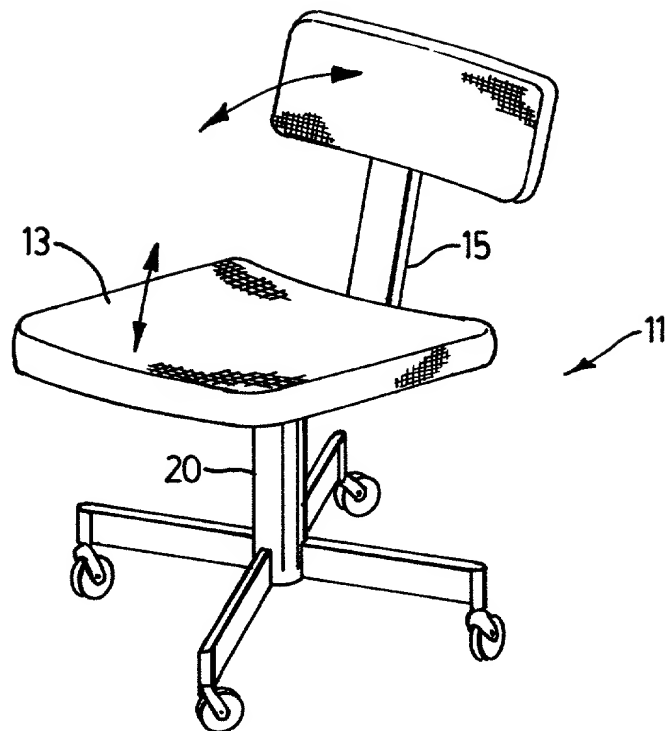


FIG. 1

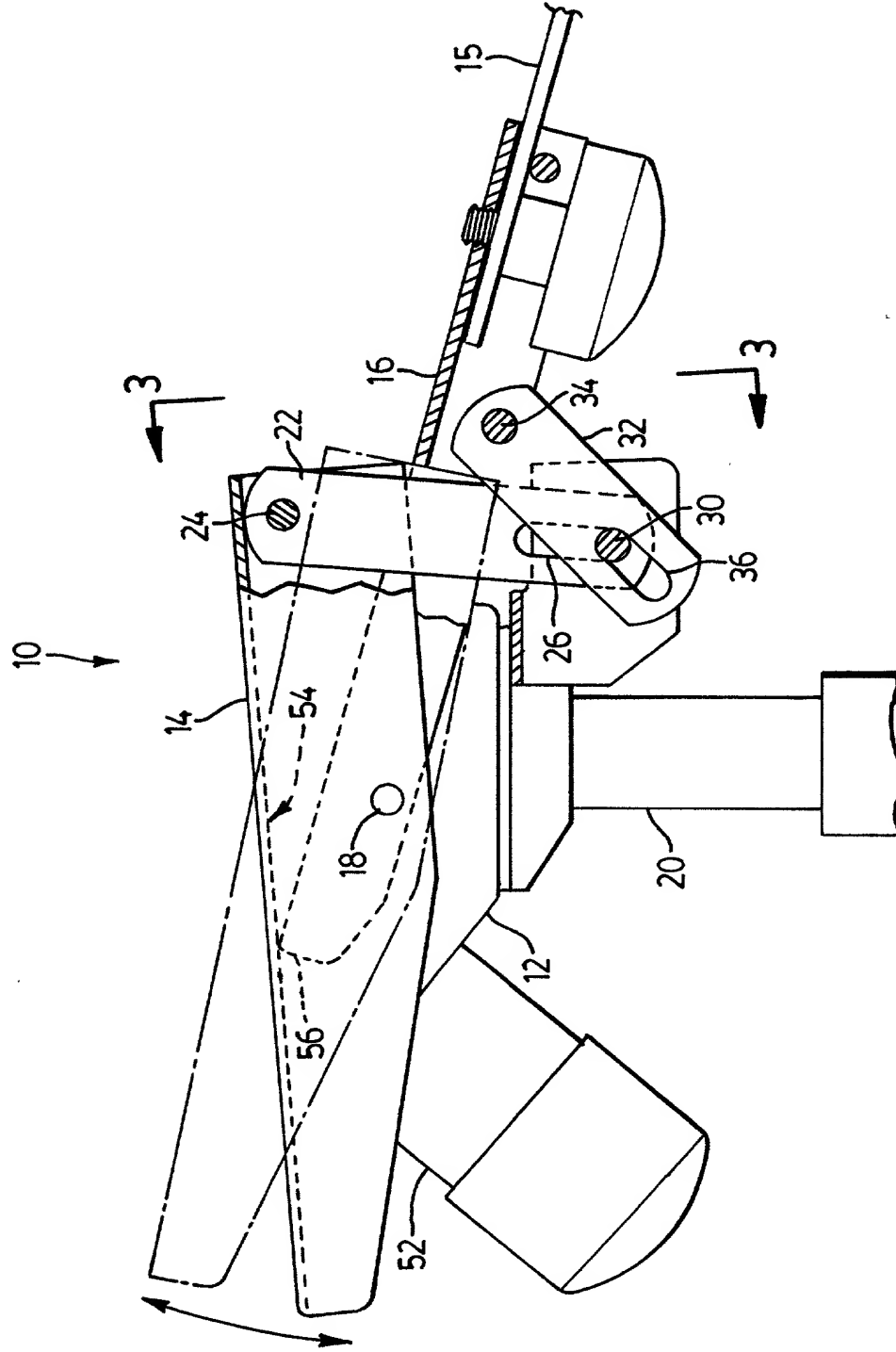


FIG. 2

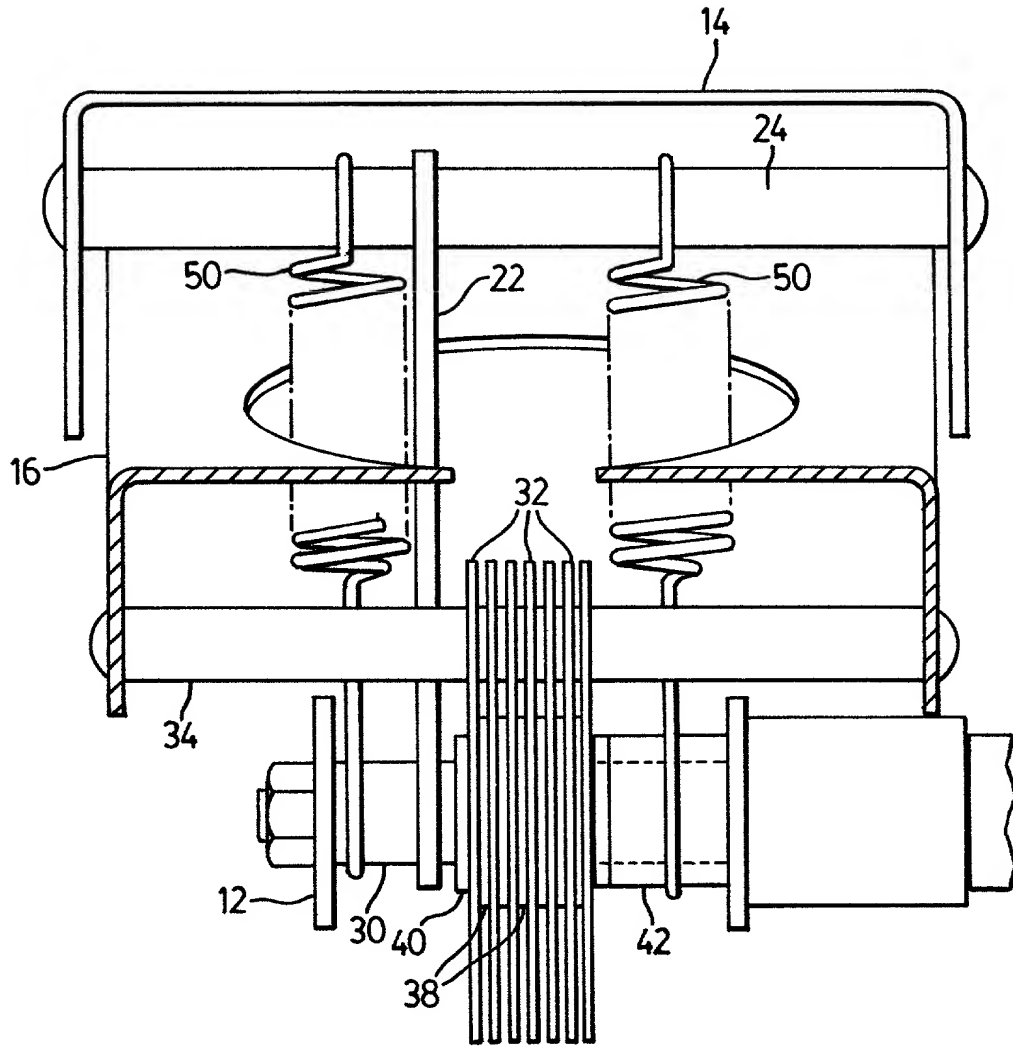


FIG. 3

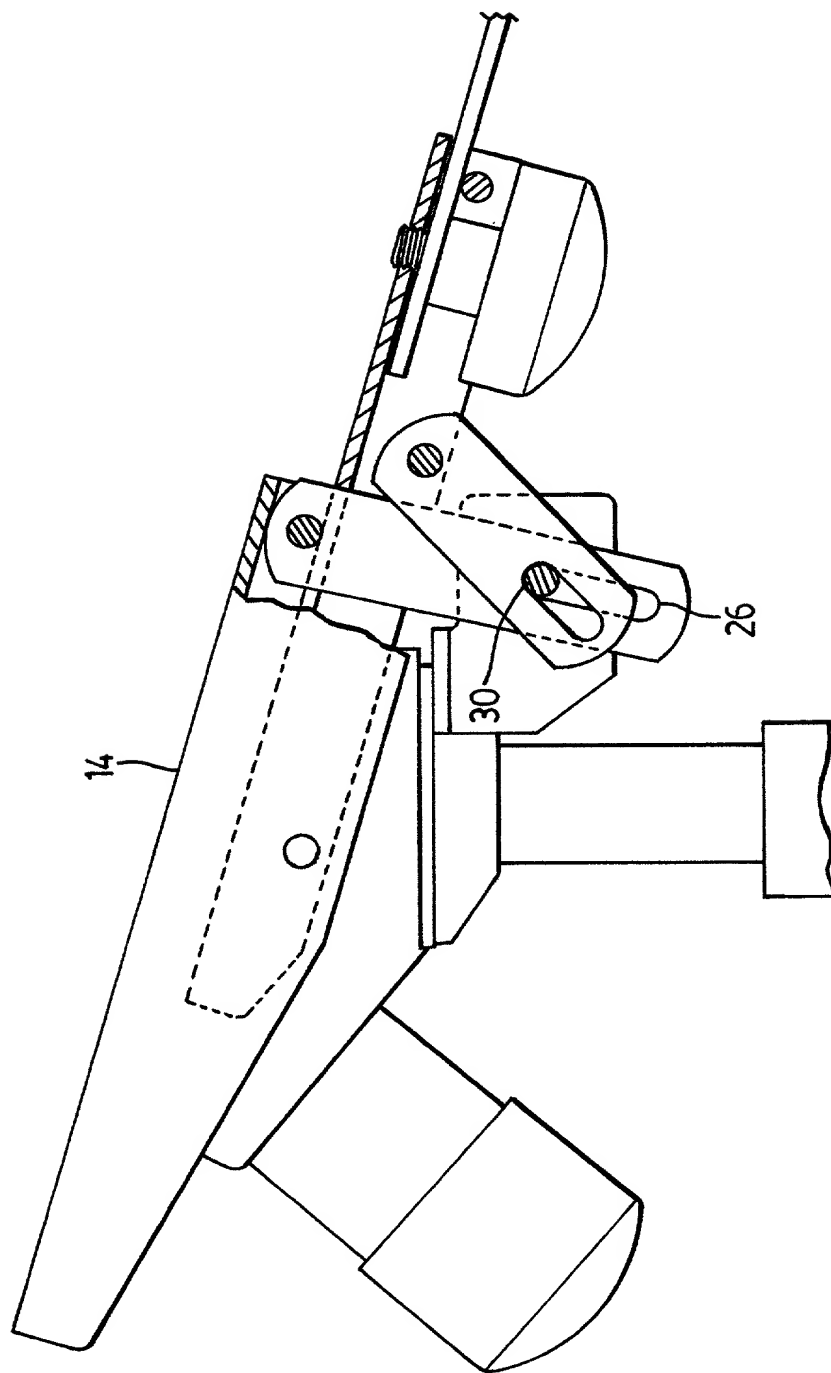


FIG. 4



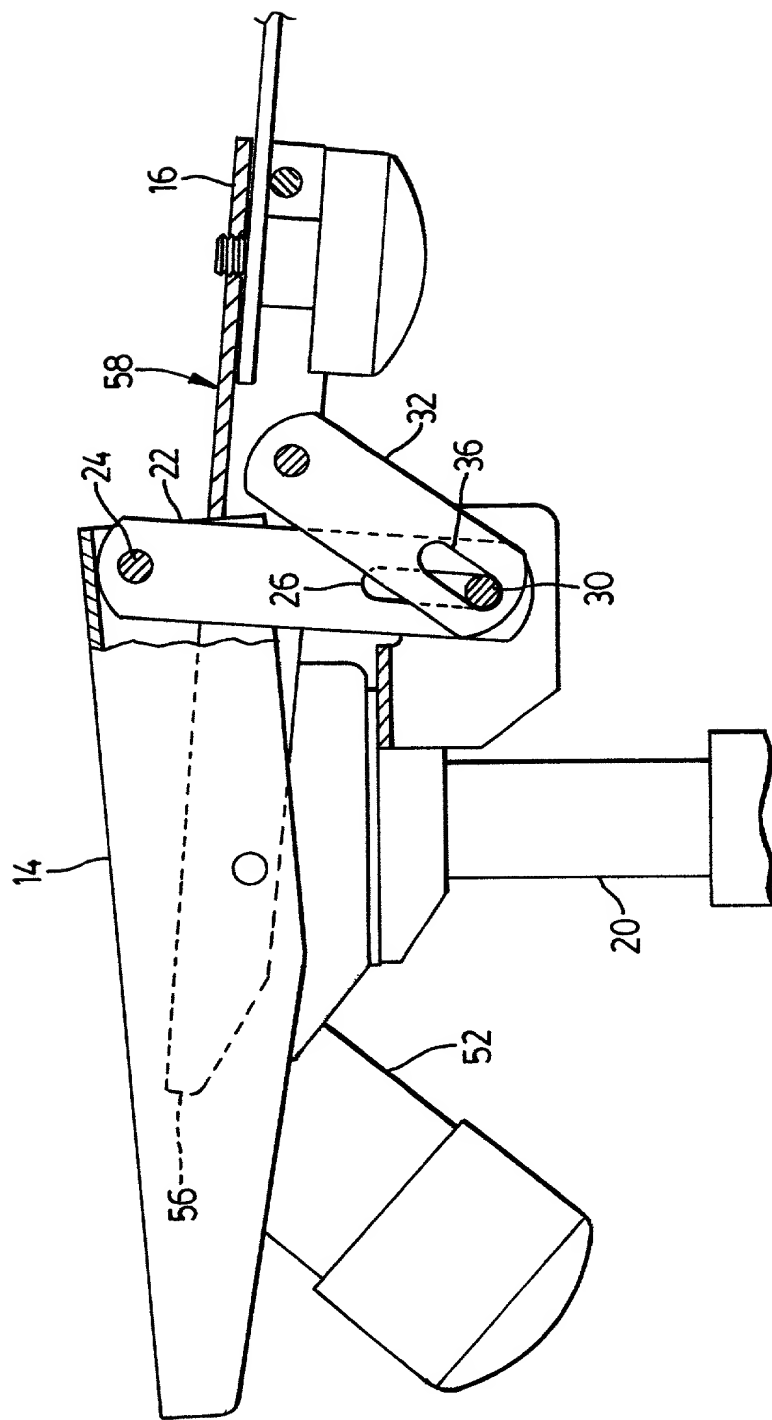


FIG. 5

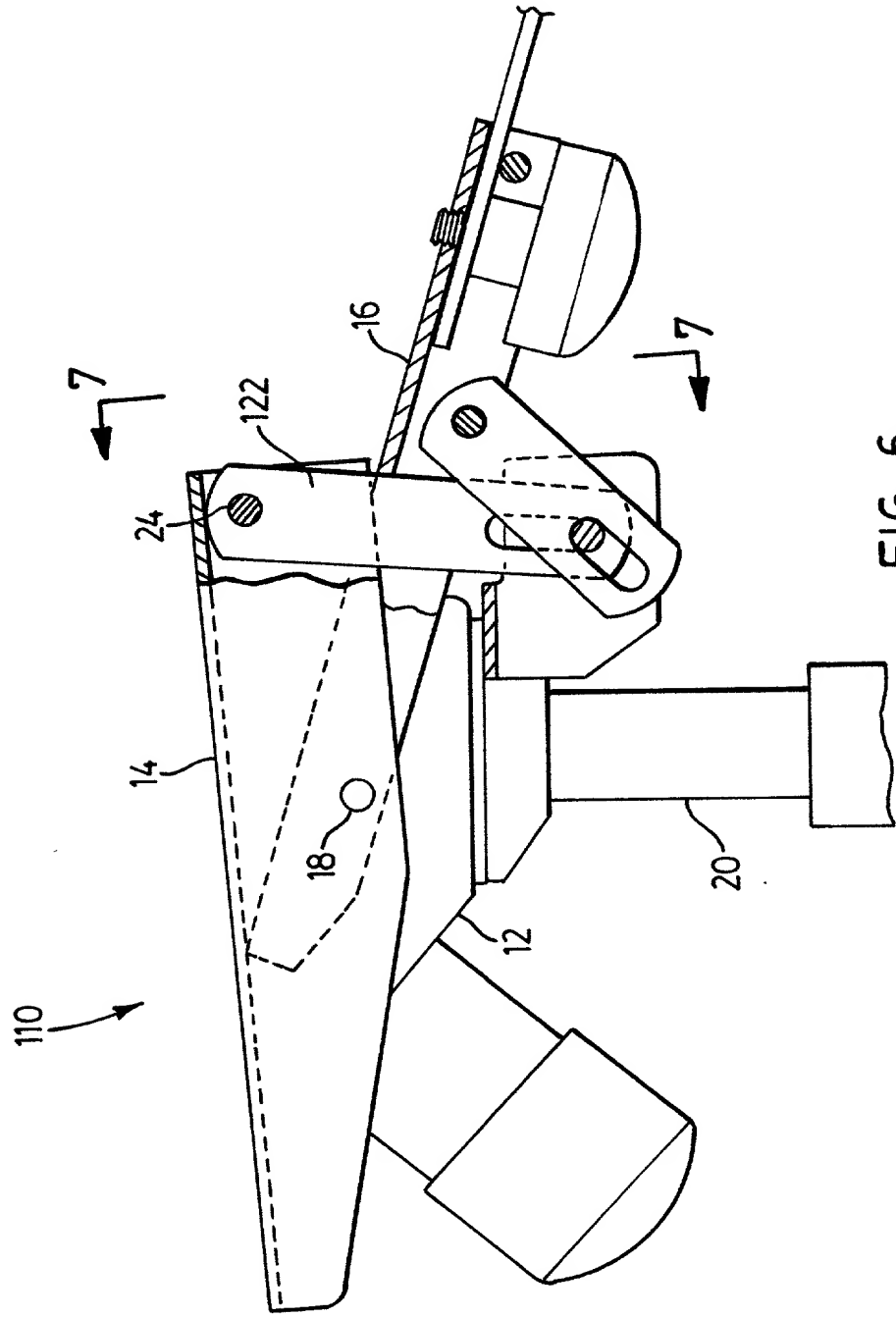


FIG. 6

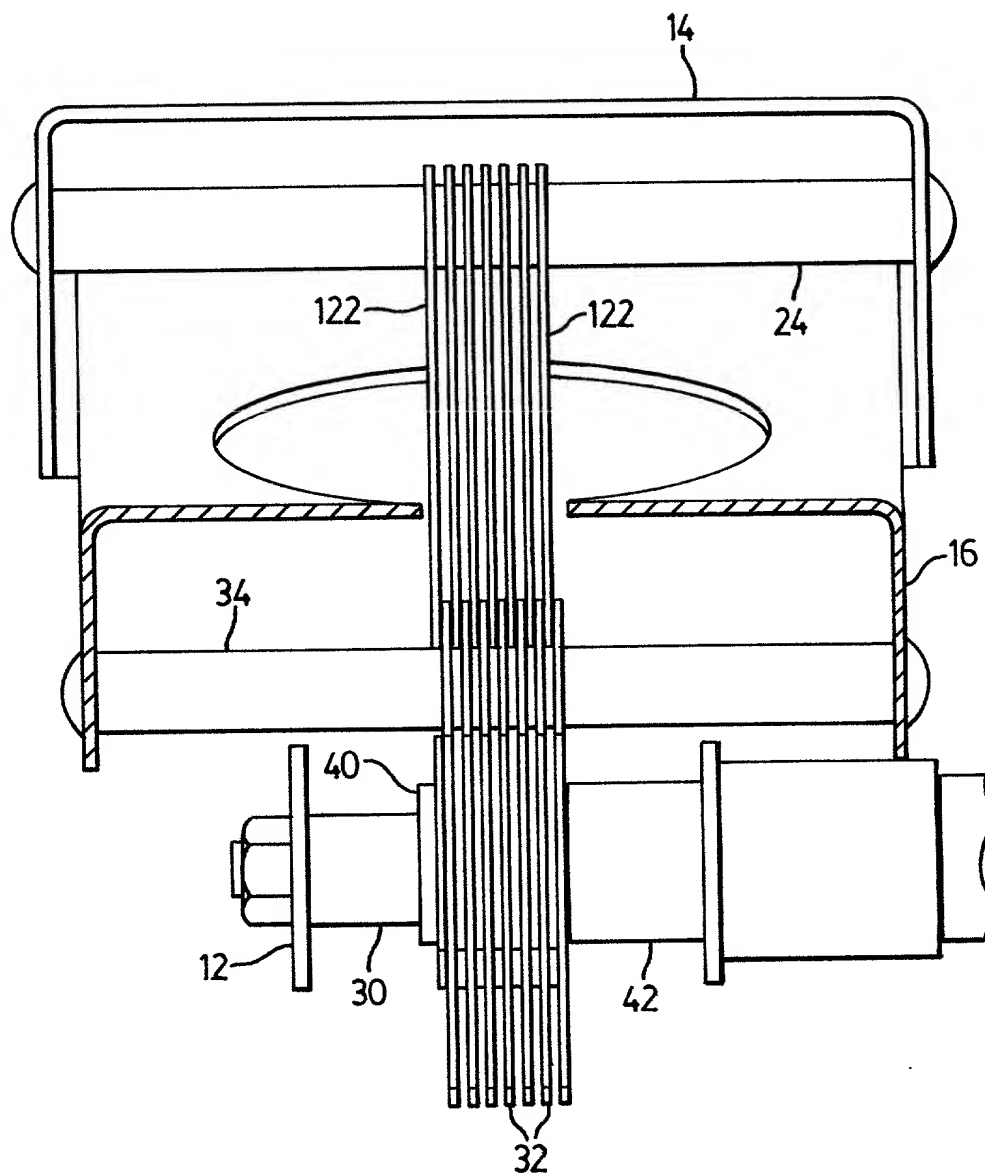


FIG. 7

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
COMBINED DECLARATION AND POWER OF ATTORNEY**

As a below named inventor, I hereby declare that: my residence, post office address and citizenship are as stated below next to my name; that I verily believe that I am the original, first and sole inventor (if only one name is listed below) or a joint inventor (if plural inventors are named below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

CHAIR SEAT TILT MECHANISM

the specification of which

(check one)      ☒ is attached hereto.  
☐ was filed on \_\_\_\_\_  
                                  as U.S. Application Serial No. \_\_\_\_\_.  
☐ was filed on \_\_\_\_\_  
                                  as PCT International Application No. PCT / \_\_\_\_\_.

and (if applicable) was amended on \_\_\_\_\_.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information known to me which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §§ 1.56(a) and (b), which state:

"(a) A patent by its very nature is affected with a public interest. The public interest is best served, and the most effective patent examination occurs when, at the time an application is being examined, the Office is aware of and evaluates the teachings of all information material to patentability. Each individual associated with the filing and prosecution of a patent application has a duty of candor and good faith in dealing with the Office, which includes a duty to disclose to the Office all information known to that individual to be material to patentability as defined in this section. The duty to disclose information exists with respect to each pending claim until the claim is cancelled or withdrawn from consideration, or the application becomes abandoned. Information material to the patentability that is cancelled or withdrawn from consideration need not be submitted if the information is not material to the patentability of any claim remaining under consideration in the application. There is no duty to submit information which is not material to the patentability of any existing claim. The duty to disclose all information known to be material to patentability is deemed to be satisfied if all information known to be material to patentability of any claim issued in a patent was cited by the Office or submitted to the Office in the manner prescribed by §§ 1.97(b)-(d) and 1.98. However, no patent will be granted on an application in connection with which fraud on the Office was practised or attempted or the duty of disclosure was violated through bad faith or intentional misconduct. The Office encourages applicants to carefully examine:

- (1) prior art cited in search reports of a foreign patent office in a counterpart application,
- (2) the closest information over which individuals associated with the filing or prosecution of a patent application believe any pending claim patentably defines, to make sure that any material information contained therein is disclosed to the Office.

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(b) Under this section, information is material to patentability when it is not cumulative to information already of record or being made of record in the application, and

(1) It establishes, by itself or in combination with other information, a prima facie case of unpatentability of a claim; or

(2) It refutes, or is inconsistent with, a position the applicant takes in:

(i) Opposing an argument of unpatentability relied on by the Office, or

(ii) Asserting an argument of patentability.

A prima facie case of unpatentability is established when the information compels a conclusion that a claim is unpatentable under the preponderance of evidence, burden-of-proof standard, giving each term in the claim its broadest reasonable construction consistent with the specification, and before any consideration is given to evidence which may be submitted in an attempt to establish a contrary conclusion of patentability."

I hereby claim foreign priority benefits under 35 United States Code, § 119 and/or § 365 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate filed by me or my assignee disclosing the subject matter claimed in this application and having a filing date (1) before that of the application on which priority is claimed, or (2) if no priority claimed, before the filing of this application:

PRIOR FOREIGN APPLICATION(S)

<u>Number</u>	<u>Country</u>	<u>Filing Date</u> <i>(Day/Month/Year)</i>	<u>Date First</u> <u>Laid-open or</u> <u>Published</u>	<u>Date</u> <u>Patented</u> <u>or Granted</u>	<u>Priority</u> <u>Claimed?</u>
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None

I hereby claim the benefit under 35 United States Code, § 119(e) of any United States provisional application(s) listed below:

<u>Application Number</u>	<u>Filing Date</u>
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None

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, §1.56(a) which became available between the filing date of the prior application and the national or PCT international filing date of this application:

PRIOR U.S. OR PCT APPLICATION(S)

<u>Application No.</u>	<u>Filing Date</u> <i>(day/month/year)</i>	<u>Status</u> <i>(pending, abandoned, granted)</i>
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None

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that wilful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such wilful false statements may jeopardize the validity of the application or any patent issued thereon.

09611506-070700

I hereby appoint the following patent agents with full power of substitution, association and revocation to prosecute this application and/or international application and to transact all business in the Patent and Trademark Office connected therewith:

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Date: June 27/00

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